

# Does the menstrual cycle modulate how trustworthy a woman sounds?

Wilhelm K. Klatt & Janek S. Lobmaier

University of Bern, Department of Psychology

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## Research Questions

- Does the menstrual cycle phase affect perceived attractiveness and trustworthiness of women's voices?
- Does sentence content have an influence on the speakers, the perceivers, or both?

## Introduction

- Many studies suggest that women's voices are affected by menstrual cycle<sup>1,2,3</sup>
- However, these studies focused on vocal attractiveness

## Method

- The voice of 20 female speakers ( $M = 22.7$  years,  $SD = 2.3$ ; non-smokers, regular menstrual cycle, no hormonal contraception, no pregnancy, no breastfeeding) was recorded before ovulation and in the luteal phase
- Three sentences were of neutral content and three sentences suggested a context in which you want get to know someone
- Ovulation was determined by means of ovulation tests and the cycle phases were confirmed by means of hormone assays<sup>4</sup>



- For each speaker, voice recordings of both cycle phases were paired
- 60 independent perceivers (30 women,  $M = 27.3$  years,  $SD = 11.6$ ) were asked to pick the voice sample of each pair that sounded more trustworthy (Block 1) or more attractive (Block 2) in a two-alternative forced choice paradigm
- Another 60 independent perceivers (30 women,  $M = 22.9$  years,  $SD = 7.1$ ) were given the same task but with low-pass filtered recordings (400 Hz)
- All participants reported to have no hearing problems
- Low-pass filtering preserves variation in fundamental frequency but makes speech incomprehensible<sup>5</sup>
- In addition to the perceptual ratings, voice recordings were analysed acoustically using Praat software<sup>6</sup>

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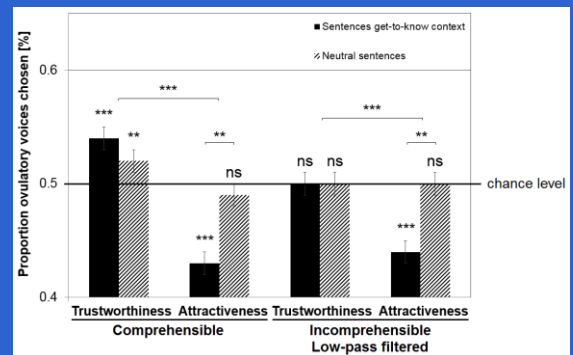
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## Conclusions

- Speakers and perceivers seem to be affected by speech content
- Our findings conflict with earlier studies which found that women's voices sound more attractive when recorded during the late follicular phase than during the luteal phase

## Results

- Comprehensible voice samples:
  - A 2 (task)  $\times$  2 (sentence content) ANOVA revealed a significant effect of "task" ( $F(1,58) = 35.244, p < .001, \eta_p^2 = .38$ ) and a significant "task  $\times$  sentence content" interaction ( $F(1,58) = 11.636, p = .001, \eta_p^2 = .17$ )
  - Women's voices were perceived as being **more trustworthy** around ovulation irrespective of sentence content (get-to-know context  $M = .54, SD = .07, t(59) = 5.183, p < .001, r = .09$ ; neutral sentences  $M = .52, SD = .07, t(59) = 2.679, p = .01, r = .04$ ) than during the luteal phase
  - Women's voices were perceived as being **more attractive** in the luteal phase, but only in sentences with get-to-know context ( $M = .57, SD = .11, t(59) = 4.688, p < .001, r = .08$ ); in neutral sentences there was no preference for either cycle phase (chance level)
- Incomprehensible, low-pass filtered voice samples:
  - A 2 (task)  $\times$  2 (sentence content) ANOVA revealed a significant effect of "task" ( $F(1,58) = 5.199, p = .026, \eta_p^2 = .08$ ), a significant effect of "sentence content" ( $F(1,58) = 6.943, p = .011, \eta_p^2 = .11$ ) and a significant "task  $\times$  sentence content" interaction ( $F(1,58) = 7.236, p = .009, \eta_p^2 = .11$ )
  - Women's voices were perceived as being **equally trustworthy** in both cycle phases irrespective of sentence content (get-to-know context  $M = .50, p > .95$ ; neutral sentences  $M = .50, p > .98$ )
  - Women's voices were perceived as being **more attractive** in the luteal phase, but only in sentences with get-to-know context ( $M = .56, SD = .11, t(59) = 4.058, p < .001, r = .07$ ); in neutral sentences there was no preference for either cycle phase (chance level)
- Phonetic analysis showed no cycle-dependent differences



## Discussion

- Women might express increased affiliation motivation<sup>7</sup> during the luteal phase in their voices, but only in sentences with social content
- Low-pass filtered recordings suggest that the speakers were affected by speech content in sentences with get-to-know context
- Evaluation of cycle-dependent changes in women's voices seems to be modulated by speech content and task

Contact Information: wilhelm.klatt@psy.unibe.ch

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